

**Remarks:**

1. Claims 1 through 84 were originally presented in this application. No claims have been added, canceled, or amended. By a series of earlier restriction requirements, claims 12 through 21, 33 through 80, 83, and 84 were withdrawn from consideration. Applicant expressly reserves the right to present claims 12 through 21, 33 through 80, 83, and 84 for further prosecution via divisional application(s). Claims 1 through 11, 22 through 32, 81, and 82 have been examined and are addressed in the Office Action. Claim 8 was allowed. Other pending claims were rejected and are addressed below.

2. Independent claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Dowell et al.* (U.S. Patent 5,899,958) in view of *Smith* (SPIE Vol. 1733, p. 3-26, 1992). Dependent claims 2 through 7, 9 through 11 and 22 through 32 also stand rejected as being unpatentable over *Dowel et al.* in view of *Smith* and various other references.

3. With regard to independent claim 1, starting on page 4 of the Office Action, the Examiner states, "It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a piezo-composite transducer element including regions of piezoelectric material deployed in a matrix of a substantially non-piezoelectric material, the regions extending through a thickness of the transducer element in at least one dimension." The Examiner further states "it would have been obvious to one having ordinary skill in the art at the time the invention was made [to have] electrodes disposed on each of said faces in order to produce an extensional pulse in the piezoelectric material and thereby produce an acoustic wave emanating from the face of the device."

4. The Applicant respectfully traverses this rejection. Applicant respectfully submits that the Examiner has failed to make a *prima facie* case of obviousness. As the Federal Circuit has held, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant." *In re*

*Kotzab*, 271 F.3d 1365, 1370 (Fed. Cir. 2000). The Examiner “must provide particular findings” supporting a combination of prior art references. *Id.* Indeed, the Federal Circuit has emphasized the need for a “rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.” *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999); *see also In re Fine*, 837 F.2d 1071, 1074-75 (Fed. Cir. 1988). The Examiner’s statement that “it would have been obvious to one having ordinary skill in the art” to combine *Dowell et al.* and *Smith* is merely conclusory and does not support the combination of *Dowell* and *Smith*.

5. The obviousness rejection of claim 1 is improper for another reason. Even if there were evidence suggesting a combination of the *Dowell* and *Smith* references, it was not reasonable at the time of the invention to expect that *Dowell et al.* could be successfully modified in view of *Smith*. In fact, it would be unreasonable to one of ordinary skill in the downhole drilling arts to expect that transducers engineered for use in medical imaging applications (such as the piezo-composite transducers disclosed by *Smith*) would be able to withstand the extreme demands of the drilling environment. One would not reasonably expect that medical sensors would be robust enough to withstand such extreme physical demands. As stated in the Background Section of the original specification:

“Acoustic sensors used downhole must typically withstand temperatures ranging up to about 200 degrees C and pressures ranging up to about 25,000 psi. In many prior art systems, expansion and contraction caused by changing temperatures is known, for example, to cause delamination of impedance matching layers and/or backing layers from surfaces of the transducer element. Further, the acoustic sensors are subject to various (often severe) mechanical forces, including shocks and vibrations up to 650 G per millisecond. Mechanical abrasion from cuttings in the drilling fluid, and direct hits on the sensor face (e.g., from drill string collisions with the borehole wall) have been known to damage or even fracture a piezo-ceramic element in the transducer. A desirable acoustic sensor must not only survive the above conditions but also function in a substantially stable manner for up to several days (time of a typical drilling operation) while exposed thereto.”

Applicant submits that it would have been unreasonable to expect that the medical piezocomposite transducers disclosed by *Smith* could withstand the above-described thermal and physical demands.

6. For the foregoing reasons, Applicant respectfully submits that claim 1 as originally presented is allowable. Applicant requests reconsideration and allowance of claim 1. Independent claim 1 being allowable, it follows *a fortiori* that dependent claims 2 through 7, 9 through 11 and 22 through 32 must also be allowable, since these dependent claims carry with them all the elements of independent claim 1.

7. The structure of independent claims 81 and 82 that is relevant to the Examiner's obviousness rejection of claims 81 and 82 is substantially similar to corresponding structure recited in claim 1. Applicant submits that independent claims 81 and 82 are therefore allowable over the prior art of record for the reasons set forth above. Applicant respectfully requests reconsideration and allowance of independent claims 81 and 82.

8. Independent claim 81 and dependent claim 3 (which depends from claim 1), are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Dowel et al.* in view of *Smith* (as applied to claim 1 above) and in further view of *Helke* (U.S. Patent Application 2005/0006620) and *Taniguchi et al.* (U.S. Patent 6,262,916). The combination of these references is not supported by any evidence. The arguments made above apply with equal force to the rejections of claims 3 and 81.

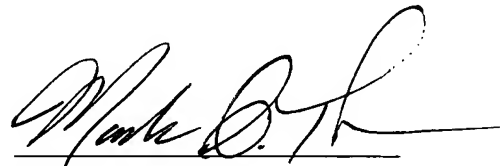
9. Applicant submits that the Examiner's § 103(a) rejection of claims 3 and 18 is further improper since the *Helke* reference did not publish until 18 months after the filing date of the instant application.

Applicant believes that in view of the foregoing remarks, pending claims 1 through 11, 22 through 32, 81, and 82 are allowable, and that this application is now in full condition

for allowance, which action Applicant earnestly solicits. Should the Examiner have any questions, or believe that a telephone interview may expedite the further examination of this application, the Examiner is requested to contact the undersigned at the telephone number shown below.

Respectfully submitted,

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